Recreational Use Attainability Analysis for Lower Prairie Dog Town Fork Red River (0207) in the Red River Basin

Prepared for:
Texas State Soil and Water Conservation Board
Project 15-57

Prepared by:
Jimmy Millican
Jeff Stroebel

Texas Institute for Applied Environmental Research
Tarleton State University
Stephenville, Texas

TR1705

Summer 2017

Acknowledgements

Funding for this project was provided through a Texas State Soil and Water Conservation Board (TSSWCB) State General Revenue Nonpoint Source Grant, project number 15-57, Recreational Use Attainability Analysis for One Segment in the Red River Basin and One Water Body in the Sabine River Basin. This project was sponsored by the TSSWCB through Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University in Stephenville, Texas.

Mention of trade names or commercial products does not constitute their endorsement.

For more information about this document or any other document TIAER produces, send email to info@tiaer.tarleton.edu

Authors

Jimmy Millican, assistant research scientist, TIAER, jmillican@tiaer.tarleton.edu

Jeff Stroebel, research associate, TIAER, jstroeb@tiaer.tarleton.edu

Table of Contents

Acknowledgements i
Authors i
Table of Contents ii
List of Figures iii
List of Tables v
Chapter 1 1
Introduction 1
Problem Statement 1
Objectives 2
Stakeholder and Agency Involvement 1
Chapter 2 2
Study Area 2
Description of Lower Prairie Dog Town Fork Red River 2
Climatic Conditions 2
Land Use and Land Cover 3
Regulated Sources 6
Wastewater Discharge Facilities 6
Regulated Stormwater 7
Concentrated Animal Feeding Operations 7
Potential Unregulated Sources 7
Non-Permitted Agricultural Activities and Domesticated Animals 8
Wildlife 9
Failing On-Site Sewage Facilities 9
Historical Information on Recreational Use 9
Chapter 3 11
Lower Prairie Dog Town Fork of the Red River in Armstrong, Briscoe, Hall and Childress Counties (0207) 11
Survey Site Descriptions 11
Field Survey Results and Discussions 24
General Description of RUAA Survey Sites and Conditions for Lower Prairie Dog Town Fork of the Red River 0207 24
Physical Description of LP10 33

Physical Description of Site LP21 34
Physical Description of Site LP34 36
Physical Description of Site LP43 38
Physical Description of Site LP51 41
Physical Description of sites located on private property 42
Observations and Interviews 47
Activities Observed 47
Activities Interviewed 49
Summary 51
References 56

List of Figures

Figure 1.1 Watershed of Lower Prairie Dog Town Fork Red River (0207). 1
Figure 2.1 Monthly average precipitation for Childress and Amarillo, Texas. 3
Figure 2.2 Monthly average maximum and minimum air temperatures for Childress and Amarillo, Texas compared to RUAA guidance for field surveys. 3
Figure 2.3 Land use and land cover of the Lower Prairie Dog Town Fork Red River watershed. 6
Figure 3.1 Watershed of Lower Prairie Dog Town Fork of the Red River (0207). 12
Figure 3.2 Photograph of TIAER ATV stuck in quicksand during a reconnasiance trip on Lower Prairie Dog Town Fork of the Red River. 26
Figure 3.3 Photograph of TIAER ATV stuck in quicksand during the landowner survey trip on Lower Prairie Dog Town Fork of the Red River. 27
Figure 3.4 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP10 taken on March 27, 2017, the upstream view of the 0-m transect. 33
Figure 3.5 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP10 taken on March 27, 2017, the upstream view of the 300-m transect. 34
Figure 3.6 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP21 taken on March 27, 2017, the upstream view of the 150-m transect. 35
Figure 3.7 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP21 taken on March 27, 2017, the downstream view of the 0-m transect. 36
Figure 3.8 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 10, 2015, the old cars along the streambank. 37
Figure 3.9 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 27, 2017, the upstream view of the 150-m transect. 37

Figure 3.10 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 27, 2017, the upstream view of the 300-m transect. 38

Figure 3.11 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP43 taken on March 27, 2017, the downstream view of the 0-m transect. 39

Figure 3.12 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP43 taken on March 27, 2017, the upstream view of the 300-m transect. 40

Figure 3.13 Photograph of campsite at Lower Praire Dog Town Fork of the Red River Site LP43 taken on March 27, 2017. 40

Figure 3.14 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP51 taken on March 27, 2017, the downstream view of the 0-m transect. 41

Figure 3.15 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP51 taken on March 27, 2017, the downstream view of the 150-m transect. 42

Figure 3.16 Photograph of Lower Prairie Dog Town Fork of the Red River on private property below Site LP43 taken on May 4, 2017, the upstream view. 43

Figure 3.17 Photograph of Lower Prairie Dog Town Fork of the Red River on private property below Site LP33 taken on May 4, 2017, the across stream view. 43

Figure 3.18 Photograph of Lower Prairie Dog Town Fork of the Red River on private property above Site LP29 taken on May 3, 2017, the upstream view. 44

Figure 3.19 Photograph of Lower Prairie Dog Town Fork of the Red River on private property at Site LP28 taken on May 4, 2017, the downstream view. 45

Figure 3.20 Photograph of Lower Prairie Dog Town Fork of the Red River on private property above Site LP26 taken on May 4, 2017, the downstream view. ... 45

Figure 3.21 Photograph of Lower Prairie Dog Town Fork of the Red River on private property near Site LP20 taken on May 2, 2017, the across stream view. .. 46

Figure 3.22 Photograph of Lower Prairie Dog Town Fork of the Red River on private property near Site LP17 taken on May 3, 2017, the across stream view. .. 47

Figure 3.23 Photograph of ATV sign on Lower Prairie Dog Town Fork of the Red River at Site LP43 taken on March 9, 2015 showing rules and regulations for ATVers. 48

Figure 3.24 Photograph of small footprints on Lower Prairie Dog Town Fork of the Red River at Site LP10 taken on March 27, 2017..... 49

Figure 3.25 Summary of observed and interviewed human activities on the lower portion of Lower Prairie Dog Town Fork of the Red River. 53

Figure 3.26 Summary of observed and interviewed human activities on the upper portion of Lower Prairie Dog Town Fork of the Red River. 54

List of Tables

Table 2.1 Land use/land cover classes within the Lower Prairie Dog Town Fork Red River watershed. 4

Table 2.2 Estimated livestock numbers within the Lower Prairie Dog Town Fork Red River watershed based on County Level data and adjusted for the percent of the county represented by the watershed (Source: USDA, 2012) 8

Table 3.1 Description and location of RUAA field survey sites for Lower Praire Dog Town Fork of the Red River, Water Body 0207. 13

Table 3.3 Rainfall records with maximum and minimum temperature for Childress, Texas and Amarillo, Texas 30 days prior to the RUAA survey initiated on May 2-4, 2017. 29

Table 3.4 Stream channel and corridor appearance for each site sampled along Lower Praire Dog Town Fork of the Red River (0207). 30

Table 3.5 Thalweg depth, stream flow type, and site accessibility during the two surveys of Lower Prairie Dog Town Fork of the Red River (0207). 30

Table 3.6 Description of surveyed stream sites along Lower Prairie Dog Town Fork of the Red River during first survey performed March 27, 2017. 31

Table 3.7 Stream aesthetics along Lower Prairie Dog Town Fork of the Red River during first survey performed March 27, 2017 32

Table 3.8 Summary of recreational activities noted in interviews for Lower Prairie Dog Town Fork of the Red River. 50

Chapter 1
Introduction

Problem Statement

Lower Prairie Dog Town Fork Red River (0207) is a classified water body identified for assessment purposes by the Texas Commission on Environmental Quality (TCEQ). Lower Prairie Dog Town Fork Red River is approximately 113 river miles long and is defined in the 2014 Texas Integrated Report of Surface Water Quality (TCEQ, 2014) as being located from a point immediately upstream of the confluence of Buck Creek in Hardeman County to a point 100 meters upstream of the confluence of Saltfork Creek in Armstrong County (Figure 1.1). Four assessment units (AUs) have been established for Prairie Dog Town Fork Red River (0207). The most downstream portion of Lower Prairie Dog Town Fork Red River has been designated as AU 0207_01 and is located from a point immediately upstream of the confluence of Buck Creek to the confluence of Grassy Creek north of Childress, TX. The section of Prairie Dog Town Fork Red River located from the confluence of Grassy Creek upstream to the confluence of Parker Creek northwest of Estelline, TX is designated as AU 0207_02. The third AU is described as being located at the confluence of Parker Creek upstream to the confluence of Battle Creek near SH 70 north of Turkey, TX. The most upstream AU is AU 0207_04 and is located from the confluence of Battle Creek upstream to the confluence of Salt Fork Creek upstream of SH 207 south of Claude, TX. The AU 0207_04 is the only AU of the four AUs that has been listed on the Texas 303(d) list as impaired for bacteria. The AU 0207_04 was first listed as impaired for bacteria on the 2006 303(d) and has continued to be listed as impaired for bacteria in the 2008, 2010, 2012, and 2014 Texas 303(d) lists. The Texas Integrated Report of Surface Water Quality[1] includes the Texas 303(d) list of impaired water bodies and is available online for years dating back to 1992.

Lower Prairie Dog Town Fork Red River (0207) has a presumed use of primary contact recreation based on the *Texas Surface Water Quality Standards* (TSWQS) (TCEQ, 2010). Prior to June 2010 only two categories of recreation use, contact and noncontact, existed in Texas. In June 2010, the TCEQ adopted revisions to the TSWQS that expanded the designation of contact recreation into three categories (primary contact recreation, secondary contact recreation 1, and secondary contact recreation 2) based on varying degrees of interaction with the water, while maintaining a fourth category of noncontact recreation. These revisions were codified in the Texas Administrative Code (TAC), Title 30 Chapter 307 and became effective as a state rule on July 22, 2010 (TCEQ, 2010). As a result of these revisions to the TSWQS, all water bodies listed as impaired based on bacteria for contact recreation are scheduled to undergo a standards review to determine if primary contact recreation is appropriate or if a revision to the use category for recreation should be considered.

Use attainability analyses (UAAs) are studies to evaluate the designated or presumed uses of a water body. To identify and assign attainable uses and criteria to individual water bodies, UAAs evaluate physical, chemical, biological, and economic factors affecting use attainment of a water body (40 Code of Federal Regulations §131.10(g)). A recreational use attainability analysis (RUAA) is a specific type of UAA focused on determining the appropriate recreational use category of a water body, the findings of which are presented within this report for Lower Prairie Dog Town Fork Red River (0207).

Objectives

The objective of this report is to present the findings of a Comprehensive RUAA for Lower Prairie Dog Town Fork Red River following the TCEQ March 2014 *Procedures for a Comprehensive RUAA and a Basic RUAA Survey* (TCEQ, 2014). An RUAA consists of three parts: field surveys to document water body characteristics and signs of recreation, interviews with stakeholders regarding past and current use of the water body, and a historical review regarding recreational use of the water body. All components of this RUAA were performed by Texas Institute for Applied Environmental Research (TIAER), which is located on the campus of Tarleton State University in Stephenville, Texas. Field surveys and interviews for the RUAA were conducted under a Texas State Soil and Water Conservation Board (TSSWCB) approved Quality Assurance Project Plan (QAPP; TIAER, 2015).

[1] https://www.tceq.texas.gov/waterquality/assessment/305_303.html

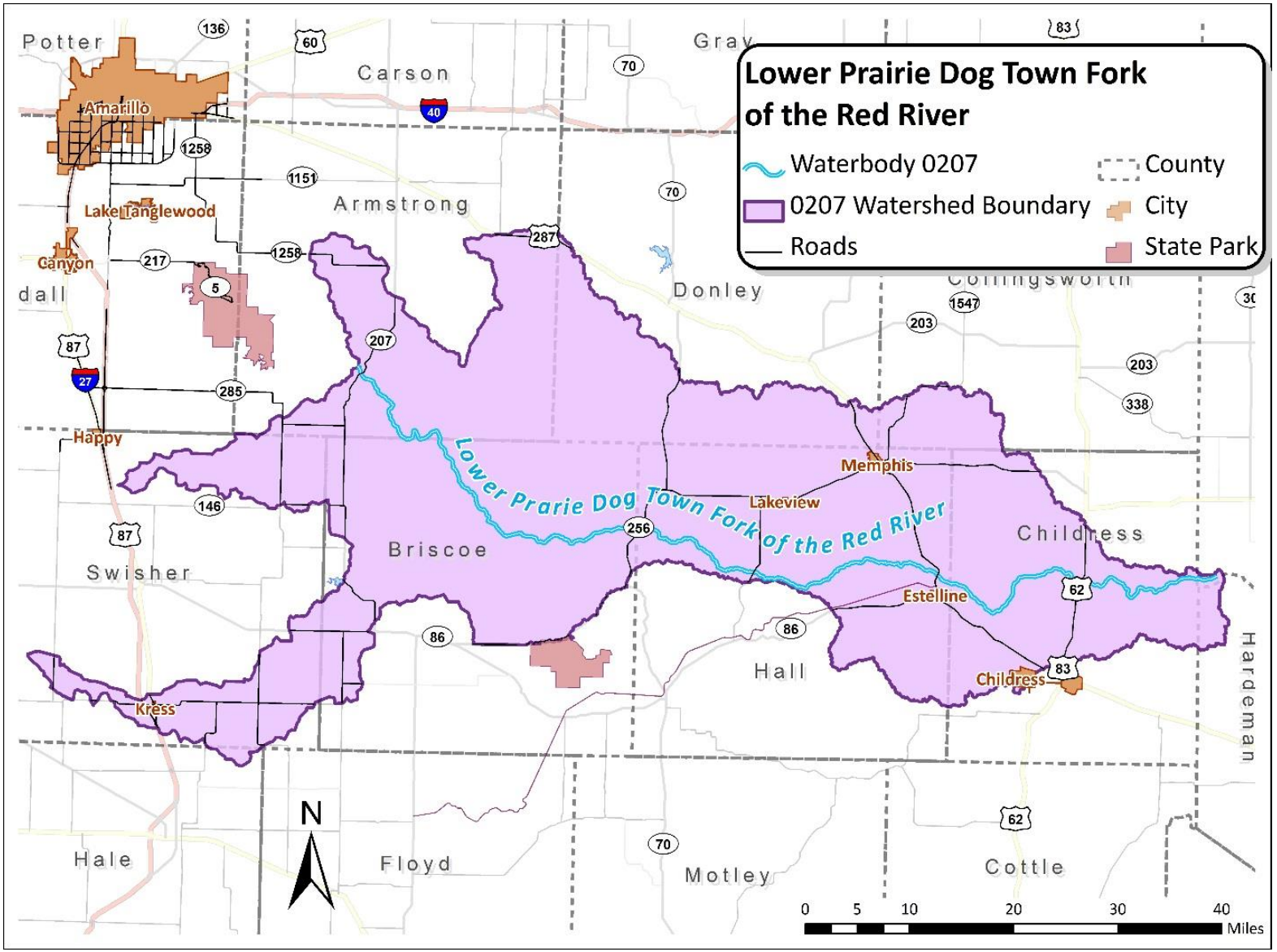

Figure 1.1 Watershed of Lower Prairie Dog Town Fork Red River (0207).

Stakeholder and Agency Involvement

The TSSWCB and its collaborating entities maintain an inclusive public participation process. From the inception of this project, the project team sought to ensure that stakeholders were informed and involved. TIAER provided coordination for public participation for this project.

Input from the TCEQ regional staff, United States Geological Survey regional staff, Texas Parks and Wildlife Department (TPWD) regional staff, TSSWCB, the Staked Plains, Cap Rock, and Hall – Childress Soil and Water Conservation Districts, Red River Authority (RRA) and other local agencies was solicited as well as input from watershed stakeholders on the need for the RUAA (see Contact Information Form available on the project website noted below).

Meetings with state agencies, river authority representatives, local officials, and stakeholders were held to give an overview of water quality issues within the Lower Prairie Dog Town Fork Red River watershed and to obtain comments on proposed survey sites prior to field data collection. Meetings targeted local and state agencies as well as stakeholders in an effort to inform them of the assessment of water quality within Lower Prairie Dog Town Fork Red River and the need for an RUAA. TIAER representatives met with officials from the Cap Rock Soil and Water Conservation District on February 5, 2015 and Hall – Childress Soil and Water Conservation District on February 10, 2015.

Due to the large size of the watershed, three identical public meetings focusing specifically on introducing the RUAA Lower Prairie Dog Town Fork Red River watershed in March 2015. The first was held at the Silverton Library in Silverton, Texas on March 30, 2015. The second was held at the First Bank and Trust in Memphis, Texas on March 31, 2015. The third identical public meeting was held on April 1, 2015 at the South Plains Electric Annex Building in Childress, Texas. At this meeting input was sought on the proposed survey sites for the Lower Prairie Dog Town Fork Red River RUAA. Attendees provided information regarding activities that typically occur within the watershed and offered assistance in accessing the stream via privately owned property.

Final, follow up public meetings occured at the same three locations mentioned above on June 26, 27, and 28, 2017. These meetings informed stakeholders of the findings of both RUAA field surveys. The next steps of the RUAA was discussed at this meeting and feedback from stakeholders was solicited. At the meeting, stakeholders were informed that the draft RUAA report is open for public review and comment. The draft report is available via the project website. Additionally, TIAER provided hard copies if desired by individuals.

Watershed stakeholders were invited to attend public meetings through mailed invitations, public announcements (TCEQ and TSSWCB webpages), and individual phone calls. Information on past meetings for this RUAA, presentations, and other information, can be found on the project's website: Lower Prairie Dog Town Fork Red River Project Webpage[2]

[2] http://tiaer.tarleton.edu/ruaa/lower-prairie-dog-town.html

Chapter 2
Study Area

Description of Lower Prairie Dog Town Fork Red River

The Lower Prairie Dog Town Fork Red River (Segment 0207) is located in the Red River Basin in the north west region of Texas and is characterized by the TCEQ as being a freshwater stream with perennial flow (TCEQ 2014). Segment 0207 watershed is approximately 1,462,070 acres (2,285 square miles) and flows through the counties of Armstrong, Briscoe, Hall, and Childress.

Palo Duro Canyon State Park is located approximately 11 miles upstream of Segment 0207. Palo Duro Canyon was formed by the Upper Prairie Dog Town Fork Red River (Segment 0229). The vast majority of the Segment 0207 watershed is rural. The largest city within the watershed is the City of Childress (population 6,105) (US Census, 2010). Other cities within the watershed include Estelline, Memphis, Lakeview, and Kress.

Climatic Conditions

Annual precipitation for the Lower Prairie Dog Town Fork Red River watershed was based on data obtained from the National Oceanic and Atmospheric Administration's website (NOAA, 2017). The large size of the watershed compelled the use of two weather stations in order to characterize weather conditions. A weather station located in Childress, Texas was selected and represents the downstream portion of the watershed while a station located in Amarillo, Texas represents the upstream portion of the watershed. Normal precipitation (1982-2016) for Childress and Amarillo, Texas averages 23.5 and 19.9 inches, repsectively with peak rainfall typically occurring in the month of June (Figure 2.1).

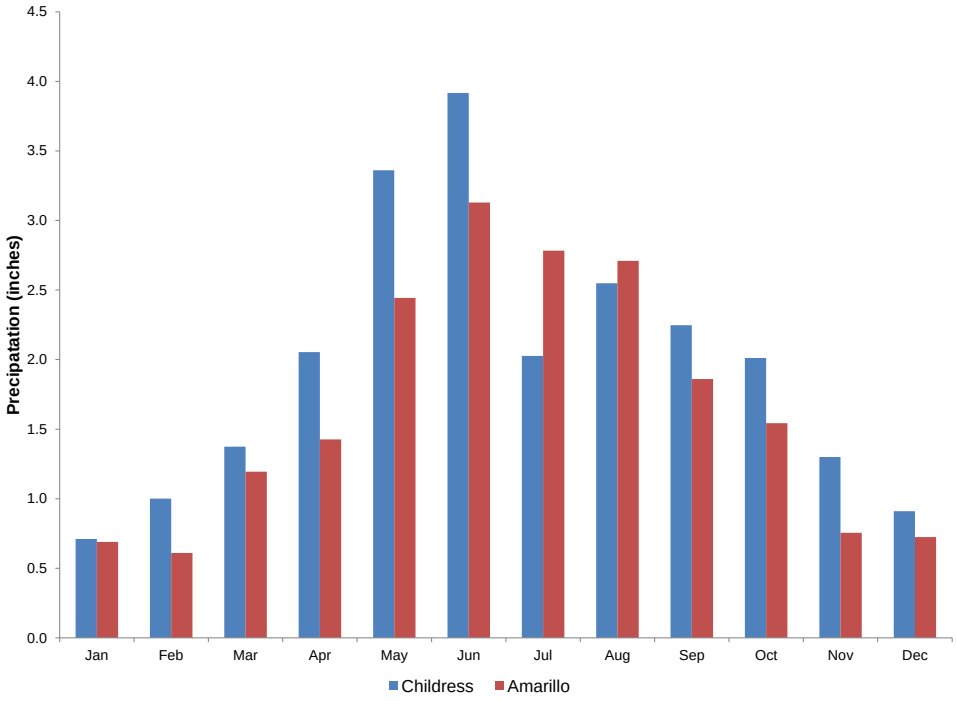

Figure 2.1 Monthly average precipitation for Childress and Amarillo, Texas.

Source: NOAA (2017) based on data for 1982-2016.

With regard to temperatures, average maximum temperatures for Childress and Amarillo, Texas ascend above 70ºF beginning in April and continue through October (Figure 2.2). March through October are the months noted as generally suitable for assessing recreational use, but only if temperatures reach above 70º F (TCEQ, 2014).

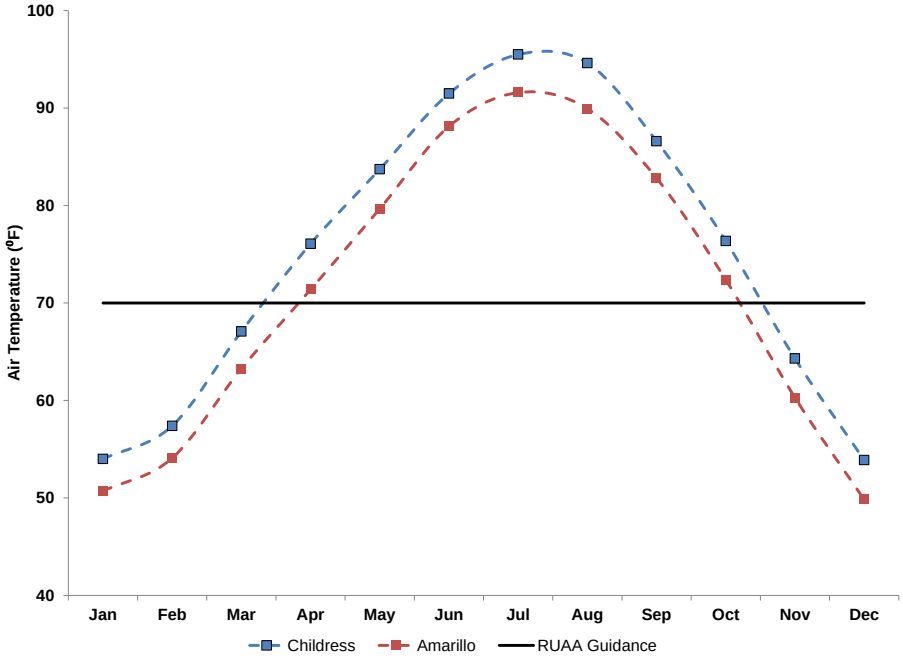

Figure 2.2 Monthly average maximum and minimum air temperatures for Childress and Amarillo, Texas compared to RUAA guidance for field surveys.

Source: NOAA (2017) based on data for 1982-2016 and TCEQ (2014).

Land Use and Land Cover

The Lower Prairie Dog Town Fork Red River watershed lies within portions of five ecoregions as defined in the publication Ecoregions of Texas (Griffith et al., 2007). The majority of the watershed is located within the Caprock Canyons, Badlands, and Breaks ecoregions which is characterized as having steep canyons, escarpments and intermittent or springfed streams. The western portion of the watershed is located within the Llano Estacado and Canadian Cimarron Breaks ecoregions. The physiography of the Llano Estacado ecoregion includes level elevated plains that decrease in elevation from west to east with few to no streams. The Canadian Cimarron Breaks ecoregions are characterized as containing tablelands, terraces and broken topography with intermittent or springfed salty streams. The eastern portion of the watershed is located within the Flat Tablelands and Valleys and Red Prairie ecoregions. The Flat Tablelands and Valleys ecoregion is characterized as having flat to gently rolling valleys and plains with intermittent streams in broad sandy channels. The Red Prairie ecoregion has been described as a level to gently roling plain with intermittent streams.

The dominant land cover within the Lower Prairie Dog Fork of the Red River is shrub/scrub at 48.9% followed by herbaceous vegetation and cultivated crops at 22.7% and 17.7%, respectively (Table 2.1 and Figure 2.3). The watershed is primarily rural with only 2.6% of the watershed comprised of developed land.

Table 2.1 Land use/land cover classes within the Lower Prairie Dog Town Fork Red River watershed.

Source: 2006 National Land Cover Database (USGS, 2006).

Class	Area (acres)	Percent (%)
Open Water	2,060	0.14
Developed, Open Space	35,776	2.45
Developed, Low Intensity	2,003	0.14
Developed, Medium Intensity	390	0.03
Developed, High Intensity	77	0.01
Barren Land	25,807	1.77
Deciduous Forest	16,412	1.12
Evergreen Forest	58,927	4.03
Mixed Forest	7,493	0.51
Shrub/Scrub	714,228	48.9
Grassland/Herbaceous	332,132	22.7
Cultivated Crops	258,888	17.7
Woody Wetlands	2,057	0.14
Emergent Herbaceuous Wetlands	4,609	0.32
Total	1,462,070	100.0

The land use/land cover for the watershed area was obtained from the National Land Cover Database (NLCD) maintained by the U.S. Geological Survey (USGS, 2006). The land use/land cover categories within the watershed are described as follows from the NLCD legend:

- **Open Water** – areas of open water, generally with less than 25% cover of vegetation or soil.
- **Developed, Open Space** – areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot, single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.

- **Developed, Low Intensity** – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
- **Developed, Medium Intensity** – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
- **Developed High Intensity** – highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- **Deciduous Forest** – areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
- **Evergreen Forest** – areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
- **Mixed Forest** – areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
- **Shrub/Scrub** – areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- **Grassland/Herbaceous** – areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
- **Cultivated Crops** – areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
- **Woody Wetlands** – areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- **Emergent Herbaceous Wetlands** – areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

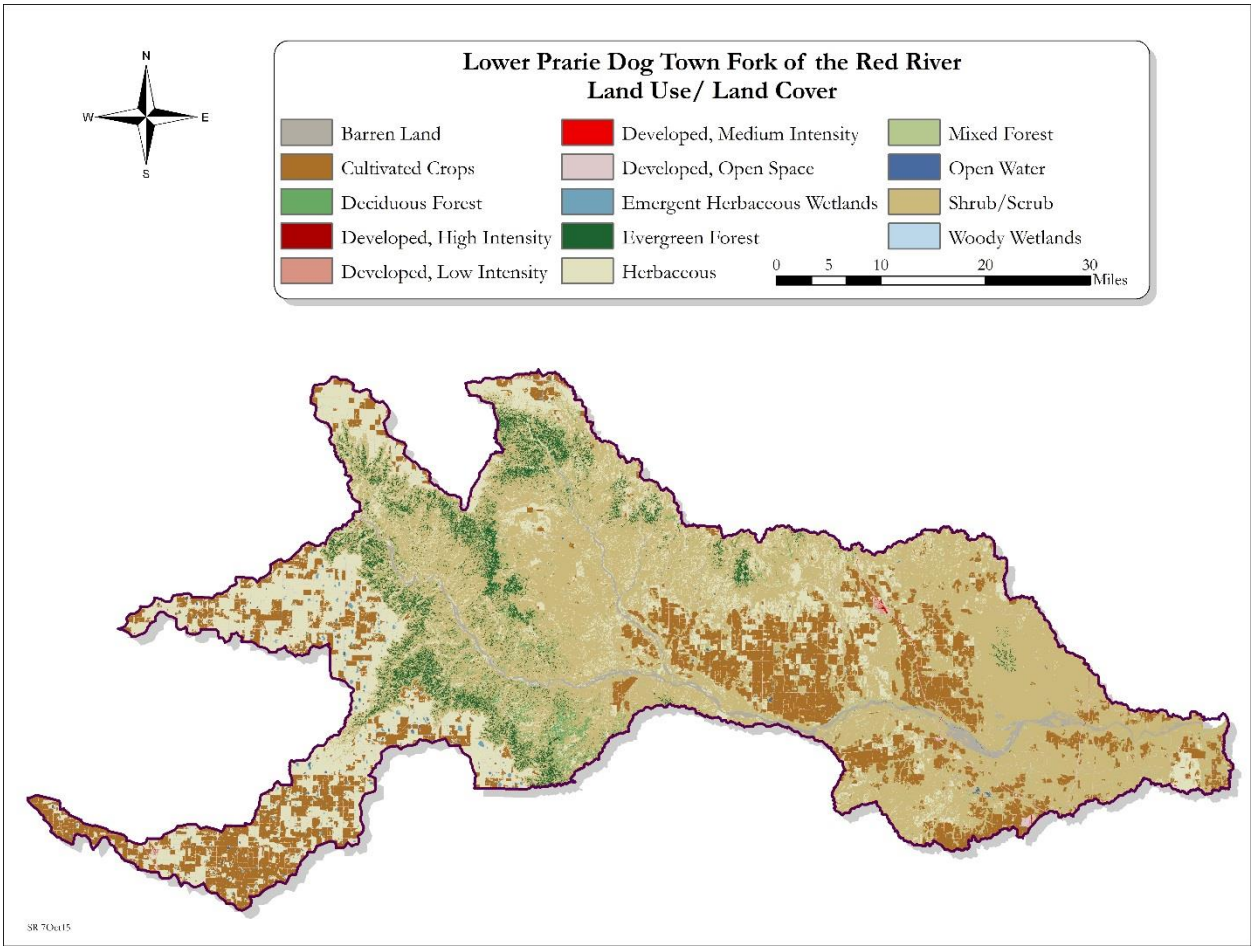

Figure 2.3 **Land use and land cover of the Lower Prairie Dog Town Fork Red River watershed.**

Source: 2006 National Land Cover Database (USGS, 2006).

Regulated Sources

Potential sources of fecal pollution, as measured by indicator bacteria *Escherichia coli (E. coli)*, can be divided into two primary categories: regulated and unregulated. Regulated pollution sources are permitted by TCEQ under the Texas Pollutant Discharge Elimination System (TPDES) and/or by the USEPA under the National Pollutant Discharge Elimination System (NPDES) and are generally point sources. Examples of regulated sources include domestic and industrial wastewater treatment facilities (WWTFs); stormwater from industries, construction, and municipal separate storm sewer systems (MS4s) of cities; and concentrated animal feeding operations (CAFOs). These various regulated sources are required to have either an individual permit that is specific for each facility or a general permit for operation.

Wastewater Discharge Facilities

The Estelline WWTF (TPDES permit WQ0011252-001) and the City of Memphis WWTF (TPDES permit WQ0010220-001) are the only WWTFs permitted to discharge into the Lower Prairie Dog Town Fork Red River (Segment 0207). The Estelline WWTF is operated by the Red

River Authority, and the City of Memphis WWTF is operated by the City of Memphis. The Estelline WWTF is authorized to discharge into a drainage ditch; thence to Mountain Creek; thence to Segment 0207. The City of Memphis WWTF is authorized to discharge into an unnamed tributary of Berkley Creek; thence to Berkley Creek; thence to Parker Creek; thence to Segment 0207. The permitted daily average flow for the Estelline WWTF is 0.0125 million gallons per day (mgd). The permitted daily average flow for the City of Memphis WWTF is 0.326 mgd. Permits for both facilities contain limits for *E. coli* in which the monthly geometric mean shall not exceed 126 most probable number (MPN) per 100 mL and a single grab sample shall not exceed 394 MPN/100 mL. The Estelline WWTF is required to monitor *E. coli* quarterly, while the City of Memphis WWTF is required to monitor *E. coli* twice a month.

Discharge monitoring reports were available through the USEPA Enforcement and Compliance History Online website (USEPA, 2016). Data obtained from monthly discharge monitoring reports for the past four years indicate that both facilities often have no effluent discharge. Discharge monitoring reports from October 2012 through December 2015 indicate that the Estelline WWTF only discharged effluent for ten months. The average flow during those ten months ranged from 0.0001 to 0.002 mgd which is below the permitted average flow of 0.0125. Discharge monitoring reports from October 2011 through December 2015 indicate that the City of Memphis WWTF only discharged effluent for four months. The average flow during those four months ranged from 0.073 to 0.107 mgd which is also below the permitted limit of 0.326 mgd.

These reports also revealed that four *E. coli* samples had been collected at the Estelline WWTF and the results from all four ranged from 1 to 24 MPN/100mL which is well below the permitted limit of 126 MPN/100mL. Four samples were collected at the City of Memphis WWTF resulting in the June 30, 2015 sample having an E. coli concentration of 158 MPN/100mL, which is in violation of the geometric mean permit limit. The maximum single grab value for *E. coli* on June 30, 2015 was 387 MPN/100mL which is below the permitted single grab limit of 394 MPN/100mL.

Regulated Stormwater

The TPDES and the NPDES Municipal Separate Storm Sewer (MS4) Phase I and II rules require municipalities and certain other entities in urban areas to obtain permits for their stormwater systems. Phase I permits are individual permits for large and medium sized communities with populations exceeding 100,000, whereas Phase II permits are for smaller communities that are located within an "Urbanized Area". An "Urbanized Area" is defined by the U.S. Census Bureau as an area with populations greater than 50,000 and with an overall population density of at least 1,000 people per square mile. Currently there are no municipalities within the Lower Prairie Dog Town Fork Red River required to obtain a MS4 permit.

Concentrated Animal Feeding Operations

There are currently no permitted CAFOs located within the watershed of Lower Prairie Dog Town Fork Red River.

Potential Unregulated Sources

Unregulated sources are typically nonpoint source in nature, meaning the pollution originates from multiple diffuse locations and is usually carried to surface waters by rainfall runoff, and the sources

are not regulated by permit under the TPDES and NPDES. Potential unregulated sources include wildlife (mammals and birds), large exotics, unmanaged feral animals (e.g., feral hogs), on-site sewage facilities (OSSFs), pets, and livestock.

Non-Permitted Agricultural Activities and Domesticated Animals

Activities such as livestock grazing close to water bodies and agricultural use of manure as fertilizer, can contribute *E. coli* to nearby water bodies. Livestock statistics were obtained from United States Department of Agriculture (USDA) National Agricultural Statistics Service website (USDA, 2012). While these are county level statistics, and, thus, only a very rough estimate of livestock in the watershed (Table 2.2), these statistics indicate that cattle are the most common livestock found within the watershed.

Table 2.2 Estimated livestock numbers within the Lower Prairie Dog Town Fork Red River watershed based on County Level data and adjusted for the percent of the county represented by the watershed (Source: USDA, 2012)

(D) indicates information was withheld by USDA to avoid disclosing data for individual farms.

The Lower Prairie Dog Town Fork Red River watershed covers 37% of Armstrong County, 28% of DonleyCounty, 6.7% of Collingsworth County, 25% of Swisher County, 0.4% of Hale County, 59% of Briscoe County, 56% of Hall County, 51% of Childress County, and 2% of Hardeman County.

County	Cattle & Calves (all beef)	All Goats	All Sheep	Horses & ponies	Mules, Burros, and Donkeys	Hogs & Pigs
Armstrong	14,772	0	275	539	15	(D)
Donley	47,471	182	(D)	551	48	34
Collingsworth	21,023	241	162	370	19	123
Swisher	183,867	230	1,050	620	29	708
Hale	147,622	656	456	317	44	212
Briscoe	13,175	1578	(D)	368	46	0
Hall	14,311	31	(D)	342	34	18
Childress	11,728	135	0	564	20	(D)
Hardeman	18,458	280	(D)	549	113	(D)
Proportional Average for Lower Prairie Dog Town Fork Red River Watershed	89,576	1,152	382	1,244	86	208

Domestic pets are another unregulated source of *E. coli* bacteria, particularly dogs, because storm runoff often carries these wastes into streams (USEPA, 2009). A rough estimate of the dog and cat population can be computed assuming there are 0.584 dogs and 0.638 cats per household (AVMA, 2012). According to the 2010 census there are 2,540 households within the Lower Prairie Dog Town Fork Red River watershed which indicates that there are potentially 1,483 dogs and 1,621 cats residing within the watershed.

Wildlife

E. coli bacteria are common inhabitants of the intestines of all warm blooded animals, including wildlife such as mammals and birds. Wildlife are naturally attracted to riparian corridors of streams and rivers. With direct access to the stream channel, the direct deposition of wildlife waste can be a concentrated source of bacteria loading to a water body. Fecal bacteria from wildlife are also deposited onto land surfaces, where it may be washed into nearby streams by rainfall runoff.

Failing On-Site Sewage Facilities

Septic systems, or on-site sewage facilities (OSSFs), are often used in rural areas without access to a central wastewater collection system. To estimate the number of potential OSSFs in the watershed, a GIS layer associated with the sewer Certificates of Convenience and Necessity (CCNs) from the Public Utility Commission of Texas was used. Because not all cities with WWTFs have CCNs, the CCN layer was supplemented with a GIS layer representing municipal boundaries. Population data from the U.S. Census Bureau were then overlaid masking out areas that would likely be serviced by WWTFs. Of the 2,540 households in the Lower Prairie Dog Town Fork Red River Watershed watersed, approximately 37% were outside of areas serviced by WWTFs and, thus likely on septic systems.

Historical Information on Recreational Use

A review of historical information was performed regarding recreational water uses for Lower Prairie Dog Town Fork Red River. The review considered the time period of November 28, 1975 to the present in accordance with 40 CFR Part 131 (EPA standards regulation). The following is a summary of the review and searches.

Government Sources:

City of Childress
http://cityofchildress.com/
Nothing significant was found

Library Sources:

The City of Childress Public Library
http://harringtonlc.org/childress/services-4/
Phone: (940) 937-8421
Searched online catalog. Nothing significant was found.

Newspaper Sources:

The Childress Index
https://www.newspapers.com/
Searched online archive. Nothing significant was found.

Internet Searches:

The Handbook of Texas Online
https://www.tshaonline.org/handbook/search
Searched the handbook by river name. Nothing significant was found.

Texas Escapes Online Magazine
http://www.texasescapes.com/default.htm
Nothing significant was found.

You Tube
https://www.youtube.com/watch?v=Wyu2yU-yhao
You Tube channel shows video of typical recreation usage of four wheel drive vehicles in Lower Prairie Dog Town Fork Red River.

Chapter 3

Lower Prairie Dog Town Fork of the Red River in Armstrong, Briscoe, Hall and Childress Counties (0207)

Survey Site Descriptions

Lower Prairie Dog Town Fork of the Red River (0207) is 113 river miles long indicating a goal of 68 sites (3 sites per 5 miles of river) for the RUAA survey. With the help of cooperating stakeholders, TIAER was able to establish a total of 51 survey sites along Lower Prairie Dog Town Fork of the Red River (Figure 3.1 and Table 3.1). 47 of the sites were publically accessible via five road crossings and four sites were accessible via private property.

Access to sites LP01 through LP46 not directly at a road crossing was possible due to an exemption to the general prohibition of operating motor vehicles within Texas streams that was included in Texas Senate Bill 155 and became effective on September 1, 2003. This exemption allows for the use of motor vehicles, such as ATVs, within the "gradient boundary" of rivers with headwaters in a state other than Texas and a mouth or confluence in a state other than Texas. The Lower Prairie Dog Town Fork Red River is one of only two rivers in Texas where this exemption applies. There is a provision within the bill that enables local authorities to permit motor vehicle access to waterways within their jurisdictions if certain criteria are met. TIAER planned to enter the river at road crossings associated with site LP10, LP21, LP34, and LP43, and use ATVs to access through site LP46.

At site LP51, there was actually very limited public access due to private property fences up the the guardrails of the bridge crossing and a fence crossing the stream on the downstream side of the bridge. For property owners between bridge crossings, access to the stream was moderately easy with primarily gently sloping shallow banks and little scrub vegetation. Three of the publicly accessible sites were co-located with TCEQ sampling stations. RUAA surveys were performed March 27, 2015 at the five bridge crossing sites and May 2-4, 2015 at private property locations where landowners allowed access. A brief description of each site follows.

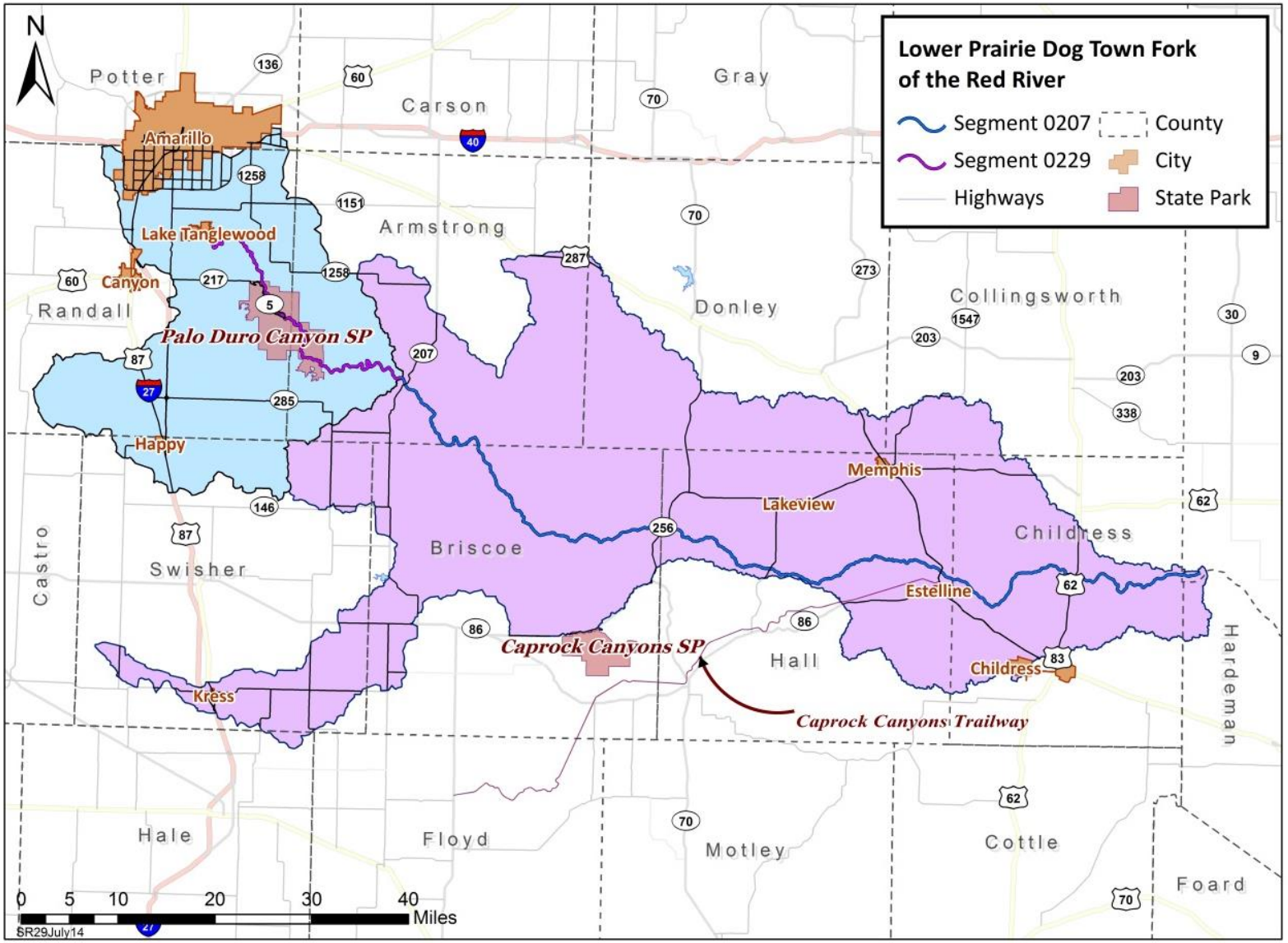

Figure 3.1 Watershed of Lower Prairie Dog Town Fork of the Red River (0207).

Table 3.1 Description and location of RUAA field survey sites for Lower Praire Dog Town Fork of the Red River, Water Body 0207.

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP01	Lower Prairie Dog Town Fork Red River 13.54 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.572425	-100.013210	0.00	2.86	Public
	LP02	Lower Prairie Dog Town Fork Red River 12.65 miles downstream of the US 62, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.570389	-100.028653	0.89	3.76	Public
	LP03	Lower Prairie Dog Town Fork Red River 11.66 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.565611	-100.043643	0.99	4.75	Public
	LP04	Lower Prairie Dog Town Fork Red River 9.84 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.552140	-100.068593	1.82	6.56	Public
	LP05	Lower Prairie Dog Town Fork Red River 8.2 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.558066	-100.092673	1.64	8.21	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP06	Lower Prairie Dog Town Fork Red River 6.56 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.544094	-100.111761	1.64	9.85	Public
	LP07	Lower Prairie Dog Town Fork Red River 4.92 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.561528	-100.123727	1.64	11.49	Public
	LP08	Lower Prairie Dog Town Fork Red River 3.82 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.571192	-100.147928	1.64	13.13	Public
	LP09	Lower Prairie Dog Town Fork Red River 1.64 miles downstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.561294	-100.168659	1.64	14.78	Public
10136	LP10	Lower Prairie Dog Town Fork Red River at US 62, 8 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.568634	-100.1943	1.64	16.42	Public
	LP11	Lower Prairie Dog Town Fork Red River 1.64 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.577421	-100.216210	1.64	18.06	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP12	Lower Prairie Dog Town Fork Red River 3.28 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.583316	-100.241334	1.64	19.70	Public
	LP13	Lower Prairie Dog Town Fork Red River 4.92 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.573485	-100.265313	1.64	21.35	Public
	LP14	Lower Prairie Dog Town Fork Red River 6.56 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.571095	-100.293179	1.64	22.99	Public
	LP15	Lower Prairie Dog Town Fork Red River 8.2 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.554886	-100.309617	1.64	24.63	Public
	LP16	Lower Prairie Dog Town Fork Red River 9.84 miles upstream of the US 62 crossing, located 3 km North of US 83/RR 2465 Intersection, 16 km North of Childress	34.533758	-100.320207	1.64	26.27	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP17	Lower Prairie Dog Town Fork Red River 6.92 miles downstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.520413	-100.341921	1.64	27.92	Public
	LP18	Lower Prairie Dog Town Fork Red River 5.28 miles downstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.533376	-100.363006	1.64	29.56	Public
	LP19	Lower Prairie Dog Town Fork Red River 3.64 miles downstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.548728	-100.383664	1.64	31.20	Public
	LP20	Lower Prairie Dog Town Fork Red River 2.00 miles downstream of the State Highway 287crossing, located approximately 1.5 miles north of Estelline	34.559734	-100.413251	2.00	33.20	Public
	LP21	Lower Prairie Dog Town Fork Red River at State Highway 287, approximately 1.5 miles north of Estelline	34.571579	-100.437304	1.65	34.85	Public
	LP22	Lower Prairie Dog Town Fork Red River 1.28 miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.577946	-100.455766	1.28	36.13	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP23	Lower Prairie Dog Town Fork Red River 2.92miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.587816	-100.481067	1.64	37.77	Public
	LP24	Lower Prairie Dog Town Fork Red River 4.56 miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.587486	-100.503976	1.64	39.41	Public
	LP25	Lower Prairie Dog Town Fork Red River 6.2 miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.588042	-100.528970	1.64	41.05	Public
	LP26	Lower Prairie Dog Town Fork Red River 7.84 miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.593795	-100.554845	1.64	42.70	Public
	LP27	Lower Prairie Dog Town Fork Red River 9.48 miles upstream of the State Highway 287 crossing, located approximately 1.5 miles north of Estelline	34.587473	-100.578751	1.64	44.34	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP28	Lower Prairie Dog Town Fork Red River 9.84 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.579007	-100.603756	1.64	45.98	Public
	LP29	Lower Prairie Dog Town Fork Red River 8.2 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.563893	-100.620136	1.64	47.62	Public
	LP30	Lower Prairie Dog Town Fork Red River 6.56 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.557817	-100.647491	1.73	49.36	Public
	LP31	Lower Prairie Dog Town Fork Red River 4.83 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.553116	-100.669661	1.55	50.91	Public
	LP32	Lower Prairie Dog Town Fork Red River 3.28 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.561890	-100.694053	1.64	52.55	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP33	Lower Prairie Dog Town Fork Red River 1.64 miles downstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.563565	-100.719955	1.64	54.19	Public
	LP34	Lower Prairie Dog Town Fork Red River at Ranch Road 657, approximately 7 miles South of Lakeview	34.571756	-100.746893	1.92	56.11	Public
	LP35	Lower Prairie Dog Town Fork Red River 1.37 miles upstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.575715	-100.768071	1.37	57.48	Public
	LP36	Lower Prairie Dog Town Fork Red River 3.01 miles upstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.573845	-100.793360	1.64	59.12	Public
	LP37	Lower Prairie Dog Town Fork Red River 4.65 miles upstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.586767	-100.811539	1.64	60.76	Public
	LP38	Lower Prairie Dog Town Fork Red River 6.3 miles upstream of the Ranch Road 657 crossing, located approximately 7 miles South of Lakeview	34.601361	-100.830873	1.64	62.41	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP39	Lower Prairie Dog Town Fork Red River 6.56 miles downstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.615964	-100.850324	1.64	64.05	Public
	LP40	Lower Prairie Dog Town Fork Red River 4.92 miles downstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.613239	-100.875419	1.64	65.69	Public
	LP41	Lower Prairie Dog Town Fork Red River 3.28 miles downstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.616418	-100.899655	1.64	67.33	Public
	LP42	Lower Prairie Dog Town Fork Red River 1.64 miles downstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.628518	-100.919170	1.64	68.97	Public
16037	LP43	Lower Prairie Dog Town Fork Red River at US 70, 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.629131	-100.942258	1.36	70.33	Public

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP44	Lower Prairie Dog Town Fork Red River 1.92 miles upstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.629244	-100.971929	1.92	72.26	Public
	LP45	Lower Prairie Dog Town Fork Red River 3.56 miles upstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.626673	34.626673	1.64	73.90	Public
	LP46	Lower Prairie Dog Town Fork Red River 5.2 miles upstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.617582	-101.021537	1.64	75.54	Public
	LP47	Lower Prairie Dog Town Fork Red River approximately 9.6 miles upstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.61761	-101.083767	4.4	34	Private

TCEQ ID	Site ID	Site Description	Latitude	Longitude	Distance from Previous Site (mi)[1]	Distance from Confluence (mi)[1]	Access
	LP48	Lower Prairie Dog Town Fork Red River approximately 19.9 miles upstream of the US 70 crossing, located 70 Km Southwest of the Northern tip of Southbound US 70 Bridge, 26.4 Km North of Turkey	34.60672	-101.21563	10.3	23.7	Private
	LP49	Lower Prairie Dog Town Fork Red River approximately 19.4 miles downstream of the SH 207 crossing, located 10 Km Southwest of FM 2272/SH 207 Intersection, 30.45 Km South of Claude	34.739488	-101.277949	7.3	16.4	Private
	LP50	Lower Prairie Dog Town Fork Red River approximately 12.1 miles downstream of the SH 207 crossing, located 10 Km Southwest of FM 2272/SH 07 Intersection, 30.45 Km South of Claude	34.80602	-101.377599	12.1	4.3	Private
13637	LP51	Lower Prairie Dog Town fork Red River at SH 207, 10 Km Southwest of FM 2272/SH 207 Intersection, 30.45 Km South of Claude	34.837009	-101.416078	3.5	112.53	Public*

[1]Distances were digitally estimated using the measuring tool in ArcGIS 9.3 with the 2010 National Agriculture Imagery Program (NAIP) 1-m digital orthophoto quarter quads (DOQQs) and the National Hydrography Dataset (NHD) stream layer as reference guides.

* Indicates public access limited to the bridge area due to fenced private property upstream and downstream of the crossing.

Sites LP01 – LP09 are located on Lower Prairie Dog Town Fork of the Red River approximately 1.6 miles to 13.5 miles downstream of the bridge crossing at US Highway 62/83, northeast of Childress, Texas. These sites were selected because of public accessibility at the bridge crossing and the sites provided opportunity for characterization of 0207.

Site LP10 (TCEQ Station 10136) is located on Lower Prairie Dog Town Fork of the Red River at the bridge crossing on US Highway 62/83, north of Childress, Texas. This site was selected because of public accessibility at the bridge crossing and the site provided opportunity for characterization of 0207.

Sites LP11 – LP20 are located on Lower Prairie Dog Town Fork of the Red River upstream of the bridge crossing at US Highway 62/83, northwest of Childress, Texas, and downstream of the bridge crossing at US Highway 287, east of Estelline, Texas. These sites were selected because of public accessibility at the bridge crossings and the sites provided opportunity for characterization of 0207.

Site LP021 is located on Lower Prairie Dog Town Fork of the Red River at the bridge crossing on US Highway 287, north of Estelline, Texas. The site was selected because of public accessibility at the bridge crossing and the site provided opportunity for characterization of 0207.

Sites LP22 – LP33 are located on Lower Prairie Dog Town Fork of the Red River upstream of the bridge crossing on US Highway 287, northwest of Estelline, Texas, and downstream of the bridge crossing on Ranch Road 657, south of Lakeview, Texas. These sites were selected because of public accessibility at the bridge crossing and the sites provided opportunity for characterization of 0207.

Site LP34 is located on Lower Prairie Dog Town Fork of the Red River at the bridge crossing on Ranch Road 657, south of Lakeview, Texas. This site was selected because of public accessibility at the bridge crossing and the site provided opportunity for characterization of 0207.

Sites LP35 – LP42 are located on Lower Prairie Dog Town Fork of the Red River upstream of the bridge crossing on Ranch Road 657, south of Lakeview, Texas, and downstream of the bridge crossing on US Highway 70, north of Turkey, Texas. These sites were selected because of public accessibility at the bridge crossing and the sites provided opportunity for characterization of 0207.

Site LP43 (TCEQ Station16037) is located on Lower Prairie Dog Town Fork of the Red River at the bridge on US Highway 70, north of Turkey, Texas. This site was selected because of public accessibility at the bridge crossing and the site provided opportunity for characterization of 0207.

Sites LP44 – LP46 are located on Lower Prairie Dog Town Fork of the Red River approximately 1.9 miles to 5.2 miles upstream of the bridge on US Highway 70, north of Turkey, Texas. These sites were selected because of public accessibility at the bridge crossing and the sites provided opportunity for characterization of 0207.

Sites LP47 – LP50 are located on Lower Prairie Dog Town Fork of the Red River on private property between the bridge crossings on US Highway 70 and on US Highway 207, north of

Turkey, Texas and south of Claude, Texas. These sites were selected because of landowner cooperation and the sites provided opportunity for characterization of 0207.

Site LP51 (TCEQ Station 13637) is located on Lower Prairie Dog Town Fork of the Red River at the bridge crossing on US Highway 207, south of Claude, Texas. Private property fences upstream and downstream of the bridge crossin limited public accessibility. This site was selected because of public accessibility, albeit limited, at the bridge crossing and site provided opportunity for characterization of 0207.

Field Survey Results and Discussions

General Description of RUAA Survey Sites and Conditions for Lower Prairie Dog Town Fork of the Red River 0207

TIAER personnel were able to utilize ATVs while scouting sites for Lower Prairie Dog Town Fork of the Red River during March of 2015. Almost all of the sites were visited traversing the streambed with little concern for quicksand, although some was encountered. Little to no water was observed and approximately 75 to 80 percent of the streambed was dry. However, before the QAPP was approved, significant amounts of rain fell within the watershed and continued throughout the summer of 2015. Between April and October, 2015, approximately 30 inches of rainfall was recorded in Amarillo, Texas and approximately 32 inches of rainfall was recorded in Childress, Texas. Local landowners warned TIAER personnel of the existence of quicksand due to the large amounts of rainfall. TIAER personnel heeded their warnings since they previously encountered quicksand while scouting as depicted in Figure 3.2. No RUAA surveys were conducted during the summer of 2015.

Between April and October, 2016, approximately 15 inches of rainfall was recorded in Amarillo, Texas and approximately 22 inches of rainfall was recorded in Childress, Texas. Although rainfall amounts were less than the previous summer, the stream could not dry significanltly enough to utilize ATVs. TIAER personnel called local landowners and game wardens to discuss conditions of the stream. When conditions were favorable, TIAER would plan to conduct the surveys within a day and additional rainfall events would occur and plans would be postponed. No RUAA surveys were conducted during the summer of 2016.

After much frustration with constant rainfall events prohibiting TIAER personnel from conducting the surveys utilizing the ATVs, TIAER personnel finally conducted the first survey on March 27, 2017 at the five bridge crossing sites. TIAER personnel were able to walk the streambed upstream and downstream of each bridge crossing. Areas of quicksand were still encountered, but personnel were able to successfully avoid sinking into the sand.

To characterize the stream between bridge crossings, TIAER personnel attempted to make contact with landowners seeking permission to access the stream from private property. With landowners accompanying TIAER personnel, a second survey was conducted May 2-5, 2017 at areas between bridge crossings to show the uniformity of the stream throughout the assessment unit. TIAER personnel were able to follow landowners on ATV's through private property to reach the stream and take pictures of the stream. TIAER personnel were unable to walk the survey reach due to the quicksand, under advisement from landowners, but were able to collect photographic

documentation of the stream appearance and current conditions. Even while following local landowners, TIAER personnel encountered areas of quicksand, shown in Figure 3.3, before ever reaching the stream. A second survey of the bridge crossing was not performed during the second trip due to conditions appearing the same as the first survey, a wide sandy streambed with shallow water depths.

Sites LP47 – LP50, which were located on private property were not visited during either survey. TIAER field personnel were unable to coordinate with the landowner a time to conduct the surveys. An interview, however, was collected and the information was included in this report.

The surveys were performed on weekdays, weekends, or holidays at opportune times to observe recreational activities. Air temperatures prior to and during both surveys were above 21°C (70°F) indicated by the RUAA guidelines as warm enough to promote recreational activities (Tables 3.2 and 3.3). In the 30 days prior to the first survey, 0.02 inches of precipitation fell in Childress, Texas and 0.11 inches of precipitation fell in Amarillo, Texas. In the 30 days prior to the second survey, 2.53 inches of precipitation fell in Childress, Texas and 1.90 inches of precipitation fell in Amarillo, Texas. While conducting the second survey with landowners, 0.24 inches of rainfall occurred in Childress with only a trace of rainfall recorded at Amarillo. The Palmer Hydrological Drought Index (PHDI) represented slightly wet conditions for the high plains region and moderately wet conditions for the low rolling plains region during the survey in March and slightly wet during the survey in May, 2017 (TWDB, 2017).

A summary of the RUAA field survey results is presented in the following tables:

- Table 3.4 describes the stream channel and corridor characteristics at each site.
- Table 3.5 notes the average thalweg depth by site during each survey and the access to the stream, whether public or private, and the ease of bank access.
- Table 3.6 documents the maximum, minimum, and average stream widths at each site for each survey and observed flow conditions.
- Table 3.7 notes stream aesthetics, wildlife observations and tracks, and the presence of garbage by site observed during each survey.

Physical descriptions of the sites follow these tables along with selected photos showing notable characteristics of the sites. The five bridge crossing sites will be discussed individually. The remaining sites will be grouped together due to overall similarities of characteristics. Although TIAER personnel were unable to visit all of the sites to conduct the surveys, pictures were collected at locations where landowners granted access to the stream. Overall thalweg depth averaged 0.2 m for the first survey at the bridge crossings when water levels were normal. During the second survey, overall thalweg depth averaged an estimated 0.3 m at the private property locations when levels were slightly elevated. Access to the stream was moderately easy at the bridge crossings which allows access to the remainder of the stream, provided an ATV is utilized to traverse the stream. Some locations between the bridge crossing provided more challenging stream entry due to steep banks. The only sites not accessible to the public were Sites LP47 – LP50, which were located on private property with a wire fence at the upper property boundary and an electric fence at the lower property boundary across the stream acting as a deterant. The dominant substrate was sand, with many areas of quicksand which TIAER personnel encountered

during both surveys. The stream corridor was scrub/shrub brush dominated. Additionally, many deposits of salt were observed on the streambed, so much so that it almost appeared as snow. The maximum stream width encountered was 14.5 m in a stream channel that was approximately 75 to 80 m wide. Flow conditions were normal during the first bridge surveys and high, according to landowners, during the second private property surveys. The water observed throughout the reach was clear with little or no aquatic life observed, ie fish. Tracks observed during both surveys were identified as deer, hog, canine and occasional bovine. Trash was rarely observed and when observed was predominantly typical plastics, aluminum cans, and bottles. Evidence of recreation was identified at all sites, except for the private property sites, in the form of ATV tracks and trails and human footprints. Site LP10 located at the bridge crossing north of Childress appeared to be a popular location with various signs of recreation observed included old campfires, shooting targets, shell casings and shatted clay targets.

Figure 3.2 Photograph of TIAER ATV stuck in quicksand during a reconnasiance trip on Lower Prairie Dog Town Fork of the Red River.

Figure 3.3 **Photograph of TIAER ATV stuck in quicksand during the landowner survey trip on Lower Prairie Dog Town Fork of the Red River.**

Table 3.2 **Rainfall records with maximum and minimum temperature for Childress, Texas and Amarillo, Texas 30 days prior to the first RUAA survey initiated on March 27, 2017.**

Survey dates are highlighted in gray. Weather Data from Weather Underground.

Date	Daily Precipitation (in) Childress, Texas	Temperature (°F) Childress, Texas		Daily Precipitation (in) Amarillo, Texas	Temperature (°F) Amarillo, Texas	
		High	Low		High	Low
25-Feb-17	0.00	50	26	0.00	53	17
26-Feb-17	0.00	64	33	0.00	60	30
27-Feb-17	0.00	79	37	0.00	71	30
28-Feb-17	0.00	75	55	0.00	75	39
1-Mar-17	0.00	60	34	0.00	55	22
2-Mar-17	0.00	66	32	0.00	61	27
3-Mar-17	0.00	69	34	0.00	65	28
4-Mar-17	0.00	68	40	0.00	72	36
5-Mar-17	0.00	81	54	0.00	80	43
6-Mar-17	0.00	84	56	0.00	79	40

Date	Daily Precipitation (in) Childress, Texas	Temperature (°F) Childress, Texas		Daily Precipitation (in) Amarillo, Texas	Temperature (°F) Amarillo, Texas	
		High	Low		High	Low
7-Mar-17	0.00	64	38	0.00	62	25
8-Mar-17	0.00	81	40	0.00	77	36
9-Mar-17	0.00	89	54	0.00	82	38
10-Mar-17	0.00	63	46	0.00	59	32
11-Mar-17	Trace	52	37	Trace	46	27
12-Mar-17	0.00	52	30	0.00	68	25
13-Mar-17	0.00	62	42	0.00	60	32
14-Mar-17	0.00	70	32	0.00	79	33
15-Mar-17	0.00	65	32	0.00	70	28
16-Mar-17	0.00	87	44	0.00	89	43
17-Mar-17	0.00	82	51	0.00	80	48
18-Mar-17	0.00	85	55	0.00	81	46
19-Mar-17	0.00	92	56	0.00	92	49
20-Mar-17	0.00	98	62	0.00	90	45
21-Mar-17	0.00	81	54	0.00	77	46
22-Mar-17	0.00	77	50	0.00	70	37
23-Mar-17	0.02	85	56	0.10	82	52
24-Mar-17	Trace	72	50	0.01	56	40
25-Mar-17	0.00	75	43	0.00	70	36
26-Mar-17	0.00	85	48	0.00	77	40
27-Mar-17	0.00	73	42	0.00	71	35

Table 3.3 Rainfall records with maximum and minimum temperature for Childress, Texas and Amarillo, Texas 30 days prior to the RUAA survey initiated on May 2-4, 2017.

Survey dates are highlighted in gray. Weather Data from Weather Underground.

Date	Daily Precipitation (in) Childress, Texas	Temperature (°F) Childress, Texas		Daily Precipitation (in) Amarillo, Texas	Temperature (°F) Amarillo, Texas	
		High	Low		High	Low
2-Apr-17	0.44	52	47	0.00	63	38
3-Apr-17	0.00	78	43	Trace	74	37
4-Apr-17	Trace	63	44	0.20	47	37
5-Apr-17	0.00	66	42	0.00	60	35
6-Apr-17	0.00	74	41	0.00	70	34
7-Apr-17	0.00	80	46	0.00	81	42
8-Apr-17	0.00	96	57	0.00	89	49
9-Apr-17	0.00	94	63	0.00	83	49
10-Apr-17	0.00	74	53	0.00	68	42
11-Apr-17	0.00	75	44	0.00	72	40
12-Apr-17	Trace	71	51	0.00	69	50
13-Apr-17	0.84	67	59	0.00	77	53
14-Apr-17	0.07	79	59	0.00	79	56
15-Apr-17	0.17	82	61	0.00	88	59
16-Apr-17	0.19	82	60	0.00	82	53
17-Apr-17	0.09	84	59	0.00	78	47
18-Apr-17	0.00	84	56	0.00	87	53
19-Apr-17	0.00	87	58	0.00	90	56
20-Apr-17	0.05	73	62	0.00	74	53
21-Apr-17	0.01	69	52	0.03	68	45
22-Apr-17	0.00	66	47	0.00	60	37
23-Apr-17	0.00	73	41	0.00	72	32
24-Apr-17	0.00	87	47	0.00	89	49
25-Apr-17	0.00	85	58	0.04	76	49
26-Apr-17	0.02	69	46	0.09	64	38
27-Apr-17	0.00	82	48	Trace	79	44
28-Apr-17	0.13	82	52	0.10	75	42
29-Apr-17	0.52	57	40	0.64	44	32
30-Apr-17	Trace	55	40	0.8	55	33
1-May-17	0.00	78	38	0.00	73	33
2-May-17	0.00	85	58	0.00	81	42
3-May-17	0.24	71	49	Trace	65	45
4-May-17	0.00	74	46	0.00	70	38

Table 3.4 Stream channel and corridor appearance for each site sampled along Lower Praire Dog Town Fork of the Red River (0207).

Site Number	Stream Channel Appearance	Dominant Substrate	Corridor Appearance	Riparian Size	Park	Landscape Surroundings
LP10	Natural	Sand	Shrub/Scrub Brush	Large	No	Native
LP21	Natural	Sand	Shrub/Scrub Brush	Large	No	Native
LP34	Natural	Sand	Shrub/Scrub Brush	Large	No	Native
LP43	Natural	Sand	Shrub/Scrub Brush	Large	No	Native
LP51	Natural	Sand	Shrub/Scrub Brush	Large	No	Native

Table 3.5 Thalweg depth, stream flow type, and site accessibility during the two surveys of Lower Prairie Dog Town Fork of the Red River (0207).

Stream flow type represents TCEQ descriptions (TCEQ, 2012). Under general access, * indicates that the site was publically accessible at a road crossing but that further access was limited by fencing of private property. For Bank Access, E = Easy, ME = Moderately Easy, MD = Moderately Difficult, D = Difficult.

Site	Reach length (m)	# of Transects	# of Recreational Areas at Site	Avg. Site Thalweg Depth (m)	Stream Flow Type	General Access	Bank Access
LP10	300	11	0	0.24	Perennial	Public	ME
LP21	300	11	0	0.09	Perennial	Public	ME
LP34	300	11	0	0.15	Perennial	Public	ME
LP43	300	11	0	0.14	Perennial	Public	ME
LP51	300	11	0	0.18	Perennial	Public*	ME

Table 3.6 Description of surveyed stream sites along Lower Prairie Dog Town Fork of the Red River during first survey performed March 27, 2017.

Site Number	Maximum Width (m)	Minimum Width (m)	Typical Average Width (m)	Observed Flow
LP10	14.5	2.5	7.0	Normal
LP21	3.5	0.0	2.0	Low
LP34	11.5	1.5	4.0	Normal
LP43	12.0	3.5	5.0	Normal
LP51	14.5	5.0	9.0	Normal

Table 3.7 Stream aesthetics along Lower Prairie Dog Town Fork of the Red River during first survey performed March 27, 2017.

From Field Data Sheet – Section F: A = absent, R = rare, C = common, Ab = abundant, N = none, NW = no water, SP = slight presence, MP = moderate presence, LP = large presence.

Site	Aquatic Vegetation	Algae Cover	Odor	Color	Bottom Deposit	Water Surface	Reptiles	Water Dependent Birds	Mammals	Evidence of wildlife	Large garbage in Channel	Small garbage in Channel	Bank garbage
LP10	A	A	N	Clear	Fine Sediment	Clear	N	N	N	Tracks/Fecal	A	R	C
LP21	A	A	N	Clear	Fine Sediment	Clear	N	N	N	Tracks/Fecal	A	A	R
LP34	A	A	N	Clear	Fine Sediment	Clear	N	N	N	Tracks/Fecal	A	R	R
LP43	A	R	N	Clear	Fine Sediment	Clear	N	N	N	Tracks/Fecal	A	A	R
LP51	A	C	N	Clear	Fine Sediment	Clear	N	N	N	Tracks/Fecal	A	A	A

Physical Description of LP10

Lower Prairie Dog Town Fork of the Red River at site LP10 was visited on March 27, 2017. This site was located north of Childress, Texas in Childress County. Site LP10 was only publicly accessible at the bridge crossing on State Highway 83/62, with private property beyond the bridge. With ample parking available and public accessibility, TIAER personnel were able to walk the streambed to conduct the survey of the 300-m reach.

This site was located in a scrub/shrub brush dominated corridor (Table 3.4). Access to the stream from adjacent native pasture land was moderately easy along the right bank with gently sloping short banks and the lack of dense vegetation. Stream access from the left bank was more challenging due to steep banks. Figures 3.4 and 3.5 depict the appearance of the site during each of the surveys.

Figure 3.4 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP10 taken on March 27, 2017, the upstream view of the 0-m transect.

Figure 3.5 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP10 taken on March 27, 2017, the upstream view of the 300-m transect.

Site LP10 was wadeable for the entire 300-m reach length. Average thalweg was 0.24 m with stream widths ranging from a minimum of 2.5 m to a maximum of 14.5 m with a typical width of 7.0 m (Tables 3.5 and 3.6). There were no obstructions encountered within the reach.

No vertebrates were observed during the survey (Table 3.7). Wildlife tracks were identified as deer and canine while feces were identified as canine and bird. Aquatic vegetation and algae were absent. Trash observed was rare to non-existent within the stream channel while it was common along the bank, primarily at the bridge crossing. The trash consisted of typical plastics, bottles and cans. Additionally there were many shell casings and shattered clay targets that covered the ground in the area near the bridge. Additional evidence of human presence observed throughout the reach were ATV tracks, motorcycle tracks and human footprints.

Physical Description of Site LP21

Lower Prairie Dog Town Fork of the Red River at Site LP21 was visited on March 27, 2017. This site was located north of Estelline, Texas in Hall County, and was only publicly accessible at the bridge crossing on State Highway 287. The stream corridor was scrub/shrub dominated on both banks (Table 3.4). A railroad trestle was located just downstream of the bridge crossing. Access to the stream was easy at the bridge crossing and moderately easy throughout the remainder of the reach with gentle slopes and minimal amounts of vegetation, although some steep banks were encountered (Table 3.5). The general appearance of the creek at this location is shown in Figures 3.6 and 3.7.

Site LP21 was wadeable for the entire 300-m reach length with an average thalweg of 0.09 m during the survey (Table 3.5). No obstructions were encountered within the survey reach. Widths of the stream ranged from 0 m to 3.5 m with a typical width of 2.0 m (Table 3.6).

Figure 3.6 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP21 taken on March 27, 2017, the upstream view of the 150-m transect.

Figure 3.7 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP21 taken on March 27, 2017, the downstream view of the 0-m transect.

No vertebrates were observed during either survey (Table 3.7). Wildlife tracks observed were identified as deer, canine and hog. Feces encountered was canine and bird. Aquatic vegetation and algae were both absent. Trash observed was absent in the stream channel and rare along the banks, consisting of plastic bottles and aluminium cans. Evidence of human presence observed throughout the reach were ATV tracks and human footprints.

Physical Description of Site LP34

Lower Prairie Dog Town Fork of the Red River at Site LP34 was visited on March 27, 2017. This site was located south of Lakeview, Texas in Hall County. The stream corridor was primarily scrub/shrub brush on both banks (Table 3.4) except for an area on the north bank, upstream of the bridge which was lined with old cars (Figure 3.8). At the site, access to the stream was moderately easy throughout most of the reach with some areas that were more challenging (Table 3.5). Figures 3.9 and 3.10 depict the general appearance of the site during each of the surveys.

Site LP34 was wadeable for the entire 300-m reach length. Average thalweg during the survey was 0.15 m (Table 3.5). The sand substrate and open channel made traversing the stream channel very easy unless quicksand was encountered which provided challenges to field personnel. Widths of the stream ranged from 4.0 m to 11.5 m with a typical average width of 1.5 m (Table 3.6). No obstructions were encountered during the survey.

Figure 3.8 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 10, 2015, the old cars along the streambank.

Figure 3.9 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 27, 2017, the upstream view of the 150-m transect.

Figure 3.10 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP34 taken on March 27, 2017, the upstream view of the 300-m transect.

No vertebrates were observed during either survey (Table 3.7). Wildlife tracks encountered during both surveys were identified as deer, raccoon, canine, bird, human and hog. Aquatic vegetation and algae were absent. Trash observed was rare to non-existent and when encountered, consisted of plastic bottles and aluminium cans. Evidence of human presence observed throughout the reach were ATV tracks and human footprints.

Physical Description of Site LP43

Lower Prairie Dog Town Fork of the Red River at Site LP43 was visited on March 27, 2017. This site was located north of Turkey, Texas in Hall County. It was publicly accessible at the bridge crossing on US Highway 70 with fenced private property upstream and downstream of the crossing. The stream corridor was scrub/shrub brush dominated (Table 3.4). Access to the stream was easy at the bridge crossing and moderately easy throughout most of the survey reach with some moderately difficult areas due to the steep banks (Table 3.5). The general appearance of the site during each survey is shown in Figures 3.11 and 3.12.

Site LP43 was wadeable for the entire 300-m reach length with an average thalweg depth of 0.14 m (Table 3.5). The dominate substrate of the stream at this site was sand. Widths ranged from a maximum of 12.0 m to a minimum of 3.5 m with a typical average width of approximately 5.0 m (Table 3.6).

No vertebrates were observed during either survey (Table 3.7). Wildlife tracks encountered were identified as canine, raccoon, deer, hog and human. Aquatic vegetation was absent while agae was

rarely observed. Trash observed was rare to non-existent and when encountered, consisted of plastic bottles and aluminium cans located along the banks of the stream. Evidence of human presence was observed throughout the reach in the form of ATV tracks within the streambed. Additionally, a trailer, tent and two ATVs were observed within the parking area near the bridge crossing (Figure 3.13).

Figure 3.11 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP43 taken on March 27, 2017, the downstream view of the 0-m transect.

Figure 3.12 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP43 taken on March 27, 2017, the upstream view of the 300-m transect.

Figure 3.13 Photograph of campsite at Lower Praire Dog Town Fork of the Red River Site LP43 taken on March 27, 2017.

Physical Description of Site LP51

Lower Prairie Dog Town Fork of the Red River at Site LP51 was visited on March 27, 2017. This site was located south of Claude, Texas in Armstrong County. Although this site was listed as publicly accessible, private property fences at the bridge crossing State Highway 207 limit public access. With landowner permission, TIAER personnel were able to cross the fence at the bridge and enter the stream to conduct the survey. The stream corridor was primarily scrub/shrub brush (Table 3.4). Access to the stream was moderately easy throughout the survey reach with only a few locations which contained steeper banks making stream entry more challenging (Table 3.5). The general appearance of the site during each survey is shown in Figures 3.14 and 3.15.

Site LP51 was wadeable for the entire 300-m reach length with an average thalweg depth of 0.18 m (Table 3.5). The dominate substrate of the stream at this site was sand. Widths ranged from a maximum of 14.5 m to a minimum of 5.0 m with a typical average width of approximately 9.0 m (Table 3.6). The only obstruction encountered was a fence across the stream located on the downstream side of the bridge crossing (Figure 3.25).

No vertebrates were observed during either survey (Table 3.7). Wildlife tracks encountered were identified as bovine, deer and hog. Bird and bovine feces were also observed within the survey reach. Aquatic vegetation was absent and algae was common during the survey. Trash was not observed within the stream bed or along the banks. Evidence of human presence was observed within the reach in the form of human footprints.

Figure 3.14 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP51 taken on March 27, 2017, the downstream view of the 0-m transect.

Figure 3.15 Photograph of Lower Prairie Dog Town Fork of the Red River Site LP51 taken on March 27, 2017, the downstream view of the 150-m transect.

Physical Description of sites located on private property

Lower Prairie Dog Town Fork of the Red River was visited, with landowner cooperation, at various locations on May 2-4, 2017. A total of six private landowners agreed to accompany TIAER personnel to locations along the Red River. The first private property landowner owned property upstream and downstream of Site LP43. The only location accessible to TIAER personnel was located approximately 0.4 miles downstream of Site LP43. As depicted in Figure 3.16, conditions at the site were similar to Site LP43, however due to areas of quicksand, personnel were unable to safely conduct a survey of the reach. The dominant substrate at this location was sand, with a very wide streambed in a scrub/shrub brush dominated corridor. Average depths at this location were approximately 0.3 meters.

The second private property landowner owned land approximately three miles upstream of Site LP34 and approximately seven miles downstream of Site LP34. Due to the heavy rains during the summers of 2015 an 2016, the roads leading to the river on his property had not been repaired and was only able to take TIAER personnel to one location, approximately 0.6 miles downstream of Site LP33. TIAER personnel were unable to collect a survey at this location, heeding the advice of the landowner about quicksand. Pictures were taken at the location show the similarities to other sites as shown in Figure 3.17. An estimated depth of 0.25 meters was recorded on the data sheet.

Figure 3.16 Photograph of Lower Prairie Dog Town Fork of the Red River on private property below Site LP43 taken on May 4, 2017, the upstream view.

Figure 3.17 Photograph of Lower Prairie Dog Town Fork of the Red River on private property below Site LP33 taken on May 4, 2017, the across stream view.

The third private property site was located from downstream of Site LP33 to approximately 0.1 mile upstream of Site LP29. While attempting to follow the landowner and reach the Red River, TIAER personnel got stuck crossing the 'Little Red' river. After the landowner used his tractor and a long cable to unstick the ATV, pictures were taken of the Red River showing the similarities to other sites as depicted in Figure 3.18. The dominant substrate was sand in a wide streambed within a scrub/shrub dominated corridor. Water depth at this location was approximately 0.6 meter but was located along a cutbank.

Figure 3.18 Photograph of Lower Prairie Dog Town Fork of the Red River on private property above Site LP29 taken on May 3, 2017, the upstream view.

The fourth private property site was located from Site LP28 to approximately 0.7 miles downstream of Site LP26. The land manager took TIAER personnel to two different locations to observe the stream. Conditions at this property were the same as other properties, with sand as the dominant substrate, wide streambed with moderately easy access in a scrub/shrub dominated corridor. Depths of the water ranged from 0.2 to 0.3 meters. According to the landowner, water levels were slightly elevated and therefore documented as high flow status on the field data sheet. Figures 3.19 and 3.20 show the conditions of the river along these private property locations.

Figure 3.19 Photograph of Lower Prairie Dog Town Fork of the Red River on private property at Site LP28 taken on May 4, 2017, the downstream view.

Figure 3.20 Photograph of Lower Prairie Dog Town Fork of the Red River on private property above Site LP26 taken on May 4, 2017, the downstream view.

The fifth private property site was located from Site LP22 to approximately 0.4 miles upstream of Site LP20. The landowner took TIAER personnel to two locations along this stretch of the Red River. Like the other locations, sand was the dominant substrate with a wide streambed. The channel is located in a scrub/shrub brush dominated corridor with estimated water depths of 0.2 meters at both locations. Figure 3.21 depicts the appearance of the stream at this location. Due to the presence of quicksand and no defined access to the stream, TIAER personnel were unable to conduct surveys at these locations.

Figure 3.21 Photograph of Lower Prairie Dog Town Fork of the Red River on private property near Site LP20 taken on May 2, 2017, the across stream view.

The sixth private property site was located approximately 0.5 miles upstream of Site LP17. The river at this location appeared similar to other private property locations. The dominant substrate was sand in a scrub/shrub dominated corridor. Water depths at the point of entry to the stream were approximately 0.6 meters, although the location was along the cutbank side of the channel. Figure 3.22 depicts the appearance of the stream during the survey.

Figure 3.22 Photograph of Lower Prairie Dog Town Fork of the Red River on private property near Site LP17 taken on May 3, 2017, the across stream view.

Observations and Interviews

Activities Observed

During each RUAA survey, field personnel visited sites during times of day and on days when recreational activities were most likely to be observed. Four of the five bridge crossing sites provided public access to the stream utilizing an ATV. Although some of the lands between the bridge crossing had no property fences, the land was private property and the trails and tracks were primarily limited to the streambed. The four bridge crossing sites with public access have posted signs about the rules and regulations of ATVing in the streambed as depicted in Figure 3.23.

No form of recreation was directly observed by TIAER staff during either of the two field surveys. While scouting the watershed for site selection, there were persons observed at two locations utilizing the stream, Sites LP10 and LP43. Since TIAER personnel used ATVs to traverse the stream from site to site while scouting, almost the entire length of the assessment unit was observed and conditions were almost identical throughout the entire length of the assessment unit.

While scouting Site LP10, a homeless man was observed at his campsite established underneath the north end of the highway 62/83 bridge. Piles of campfire wood, trash, clothing, a chair and bicycle were observed at the encampment with a tarp braced around all sides of his "home". The man was not observed in the stream but rather sitting quietly in his camp chair. An interview was collected from this homeless person.

While scouting Site LP43 and the areas upstream, TIAER personnel observed two persons riding ATVs with hunting gear. Since TIAER personnel had been walking for nearly 12 miles after getting their ATV stuck in the quicksand, the riders were definitely a welcome site. They took TIAER personnel back to their vehicle at the bridge at Highway 70. On a subsequent day while scouting the area around Site LP43, two couples were observed ATVing and arrowhead hunting at the site. Luckily, these persons were able to take TIAER staff up to their stuck ATV and retrieve the vehicle from the quicksand.

Human footprints were observed at several of the sites and most appear to have been from persons walking through the streambed. However, small footprints, Figure 3.24, were observed at Site LP10 which corresponds to information about children wading at the site from collected interviews.

No other persons were observed at any other site during the scouting trips or either of the two surveys.

Figure 3.23 Photograph of ATV sign on Lower Prairie Dog Town Fork of the Red River at Site LP43 taken on March 9, 2015 showing rules and regulations for ATVers.

Figure 3.24 Photograph of small footprints on Lower Prairie Dog Town Fork of the Red River at Site LP10 taken on March 27, 2017.

Activities Interviewed

A total of 34 interviews were collected from landowners along Lower Prairie Dog Town Fork of the Red River as well as others with interest in the watershed. The interviews indicated hunting and ATV riding as the most common recreational activities occurring throughout the stream (Table 3.10). One interview was returned by meeting attendee indicating no knowledge of the study area. Therefore, it was not included in Table 3.10.

Wading by adults and children were noted at Sites LP10, LP34 and Site LP47. Interviews collected from a landowner indicated that he had personally waded in the stream as a kid at Site LP10, before 1975, and had observed both children and adults wading in the stream more recently. Both of his adult children also stated that they had observed and heard of adults and children wading at site LP10. Additionally, all three stated that the stream is heavily utilized for hunting and ATV/UTV recreation with an occasional Jeep or other 4-wheel drive vehicle also utilizing the stream. One landowner interview stated approximately once every five years he had observed adult wading at Site LP34. The landowner at Site LP47 stated that when he was a kid he did wade and ride an ATV in the stream on his property. He explained the very salty water is abrasive and destroys bearings of ATVs very quickly. As he got older and figured this out, he quit riding and wading in the stream.

Almost all of the landowners interviewed stated that the stream has been utilized for hunting and ATVing. Most of the hunting, they state, is illegal with several landowners saying they have run off illegal hunters from their properties. They also have strong feelings about people using ATVs

in the streambed and coming on their property. Hunters use the streambed as a corridor to ride ATVs up and down and walk onto private property to hunt game illegally.

As for using the stream for primary contact recreation, most state there is insufficient water to swim and the water is very salty. If someone were to fall into the water, they would definitely spit it out. Landowners further stated that cattle, horses and wildlife in the area don't even drink the water because of the salty taste. Water depths throughout most of the year is only a few inches deep unless it is immediately after a storm event.

Activities are listed in Table 3.8 as the number of times personal use, observed use, and/or heard of use was documented from interviews for a given location or the whole assessment unit. Blank cells in Table 3.10 indicate no interviewed feedback for that location. An * in Table 3.8 indicates recreation reported from an interview for another location.

Table 3.8 Summary of recreational activities noted in interviews for Lower Prairie Dog Town Fork of the Red River.

Site Name	Number of Interviews	Swimming	Wading		Hunt	ATV
			Adult	Children		
LP01					*,*,*	*,*,*
LP02					*,*,*	*,*,*
LP03					*,*,*	*,*,*
LP04					*,*,*	*,*,*
LP05					*,*,*	*,*,*
LP06					*,*,*	*,*,*
LP07					*,*,*	*,*,*
LP08					*,*,*	*,*,*
LP09					*,*,*	*,*,*
LP10	7		2,3,3	1,3,3	1*,6*,7*	0*,4*,5*
LP11					*,*,*	*,*,*
LP12					*,*,*	*,*,*
LP13					*,*,*	*,*,*
LP14					*,*,*	*,*,*
LP15					*,*,*	*,*,*
LP16					*,*,*	*,*,*
LP17					*,*,*	*,*,*
LP18					*,*,*	*,*,*
LP19					*,*,*	*,*,*
LP20					*,*,*	*,*,*
LP21	2				1*,2*,2*	1*,1*,1*
LP22					*,*,*	*,*,*
LP23					*,*,*	*,*,*
LP24	3				*,3*,*	*,3*,*
LP25					*,*,*	*,*,*

Site Name	Number of Interviews	Swimming	Wading		Hunt	ATV
			Adult	Children		
LP26	1				1*,1*,1*	1*,1*,1*
LP27					*,*,*	*,*,*
LP28					*,*,*	*,*,*
LP29	1				*,1*,1*	*,1*,1*
LP30					*,*,*	*,*,*
LP31					*,*,*	*,*,*
LP32					*,*,*	*,*,*
LP33					*,*,*	*,*,*
LP34	1		0,1,1		*,1*,1*	*,1*,1*
LP35					*,*,*	*,*,*
LP36					*,*,*	*,*,*
LP37					*,*,*	*,*,*
LP38					*,*,*	*,*,*
LP39					*,*,*	*,*,*
LP40					*,*,*	*,*,*
LP41					*,*,*	*,*,*
LP42					*,*,*	*,*,*
LP43	10				2*,9*,10*	4*,10*,10*
LP44	2				1*,1*,1*	*,1*,1*
LP45					*,*,*	*,*,*
LP46					*,*,*	*,*,*
LP47	1		1,0,0		0,1,1	1,1,1
LP48			*,0,0		0,*,*	0,*,*
LP49			*,0,0		0,*,*	0,*,*
LP50			*,0,0		0,*,*	0,*,*
LP51	1				0,*,*	0,*,*
General AU	4				1*,0*,3*	1*,3*,4*
Totals	33		3,4,4	1,3,3	7,24,26	8,25,24

Summary

RUAA surveys were conducted at the five road crossing sites on March 27, 2017 and other private property locations on May 2-4, 2017 along Lower Prairie Dog Town Fork of the Red River (0207). Temperatures were above 21ºC (70ºF) during the 30 days prior to each survey (Tables 3.2 and 3.3). Stream flow was considered normal to slightly high during both surveys based on information provided by local residents. The Palmer Drought Severity Index (PDSI) indicated moderately wet conditions during March and slightly wet during May 2017 (TWDB, 2017).

Water in Lower Prairie Dog Town Fork of the Red River is very salty according to local landowners and typically only flows a few inches deep throughout the year and sometimes is dry.

The width of the water is usually several feet wide within a streambed that ranges from approximately 100 feet wide in the upper portion to several hundred feet wide in the lower portion of the assessment unit. The substrate of the river is sand and flows through a scrub/shrub dominated corridor. There are really no major changes in the appearance of the stream throughout the assessment unit. Poachers, tresspassers and quicksand were the major problems identified by landowners during interviews.

No recreational activities were directly observed by TIAER field staff during either survey. ATVers and hunters were encountered while scouting for sites. While scouting and also during the surveys, ATV tracks were throughout the reach with occasional sightings of bigger vehicle tracks. Site LP10 had the most evidence of recreation in the form of shell casings, fire pits, shooting targets, broken target clays and miscellaneous trash. Human footprints were observed at Sites LP10, LP21, LP34 and LP51. A tent and two 4-wheelers were observed on the bank of the stream at Site LP43.

Interviews indicated hunting and ATVing as the most common recreational activities occurring within the stream. Wading by adult and children was identified at Site LP10 and LP47. No other forms of primary contact recreation were identified at any site within the assessment unit. Public access to the stream is limited primarily to four of the five bridge crossing. Persons with ATVs, however, can access the stream at these crossings and traverse almost the entire streambed from Site LP01 to Site LP46, provided the stream is dry enough and one can avoid the quicksand. According to landowners, local law enforcement, local fire and rescue and game wardens, the general public traverse the streambed for hunting and ATVing and routinely get stuck due to the quicksand. State law makes it legal, but the locals claim that is is hazardous and would like for the law to be changed.

Recreational activities observed and reported in interviews are summarized in Figures 3.25 and 3.26. Overall RUAA findings are summarized in the form below.

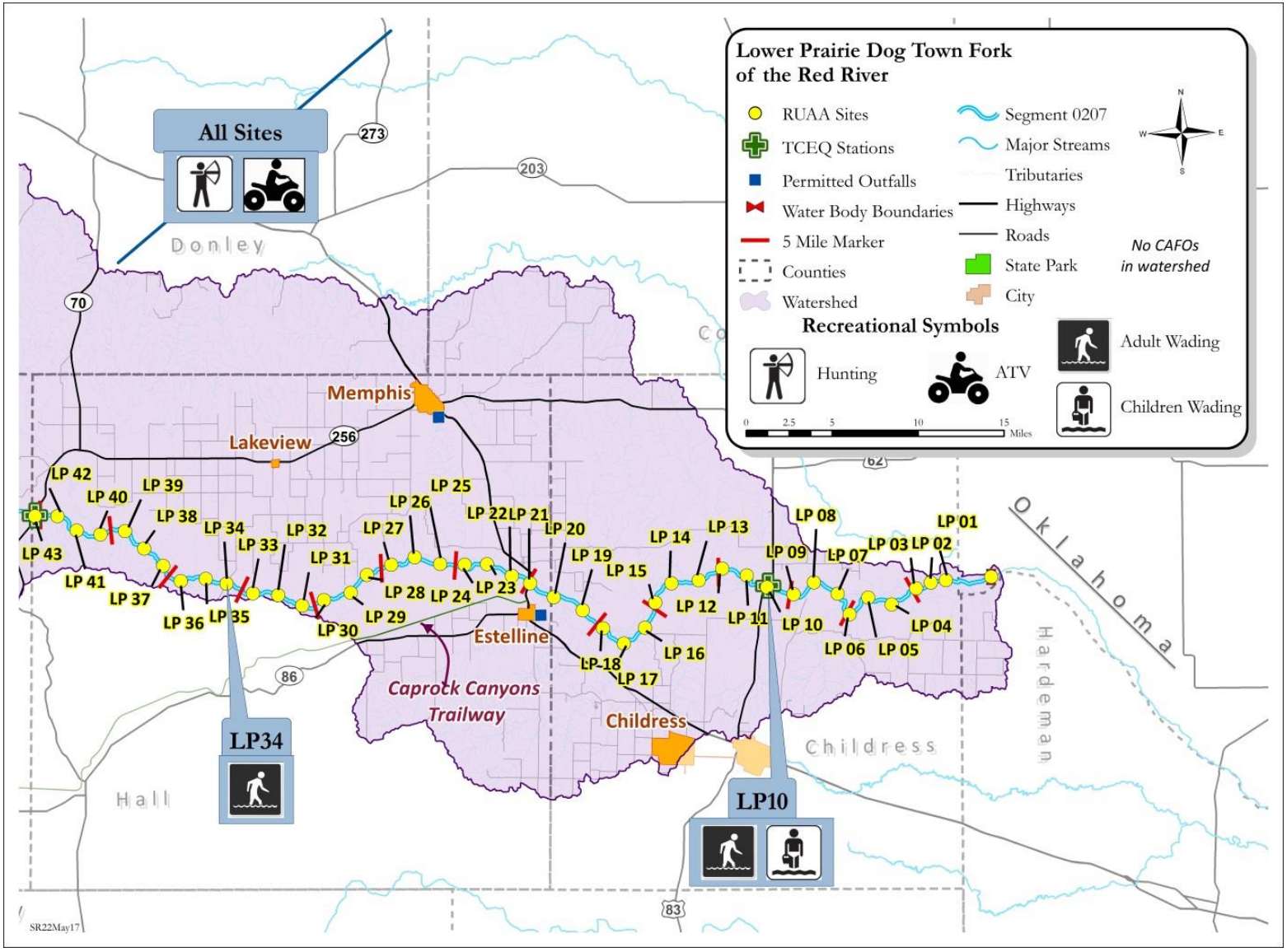

Figure 3.25 Summary of observed and interviewed human activities on the lower portion of Lower Prairie Dog Town Fork of the Red River.

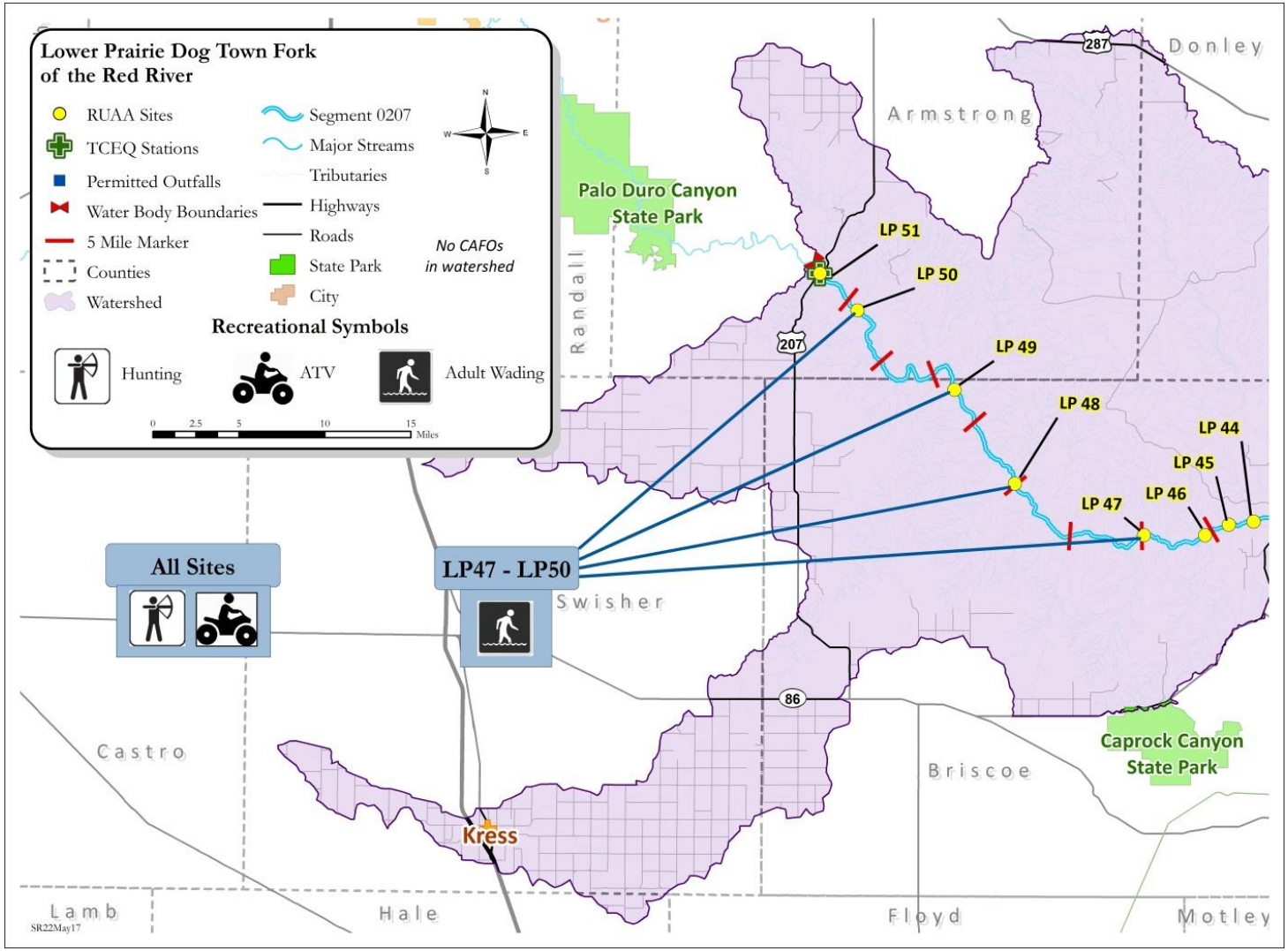

Figure 3.26 Summary of observed and interviewed human activities on the upper portion of Lower Prairie Dog Town Fork of the Red River.

RUAA Summary
(Not part of the Field Data Sheet)

This form should be filled out after RUAA data collection is completed. Use the Contact Information Form, Field Data Sheets from all sites, Historical Information Review, and other relevant information to answer the following questions on the water body.

Name of water body: Lower Prairie Dog Town Fork of the Red River
Segment No. of Nearest Downstream Segment No.:0207
Classified?:No
County:Childress, Hall, Briscoe, Armstrong

1. Observations on Use

a. Do primary contact recreation activities occur on the water body?

☐frequently ☒seldom ☐not observed or reported ☐unknown

b. Do secondary contact recreation 1 activities occur on the water body?

☒frequently ☐seldom ☐not observed or reported ☐unknown

c. Do secondary contact recreation 2 activities occur on the water body?

☒frequently ☐seldom ☐not observed or reported ☐unknown

d. Do noncontact recreation activities occur on the water body?

☐frequently ☐seldom ☒not observed or reported ☐unknown

2. Physical Characteristics of Water Body

a. What is the average thalweg depth? 0.19 meters

b. Are there substantial pools deeper than 1 meter? ☐Yes ☒No

c. What is the general level of public access?

☐easy ☒moderate ☐very limited

3. Hydrological Conditions of site visits (Based on Palmer Drought Severity Index)

☐Mild-Extreme Drought
☐Incipient dry spell
☐Near Normal
☐Incipient wet spell
☒Mild-Extreme Wet

References

AVMA, American Veterinary Medical Association. 2012. U.S. Pet Ownership Statistics. Online at: https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-pet-ownership.aspx (verified April 28, 2017).

Griffith, G., S. Bryce, J. Omernik, and A. Rogers. 2007. Ecoregions of Texas. Project report to the Texas Commission on Environmental Quality, Austin, Texas (AS-199, 12/07).

NOAA, National Oceanic and Atmospheric Administration. 2017. National Climatic Data Center, Available at https://www.ncdc.noaa.gov/cdo-web/ (link verified April 28, 2017)

TCEQ, Texas Commission on Environmental Quality. 2014. Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d), approved November 19, 2015. Available at https://www.tceq.texas.gov/waterquality/assessment/14twqi/14txir (link verified April 28, 2017).

TCEQ, Texas Commission on Environmental Quality. 2014. Recreational Use-Attainability Analyses (RUAAs) - Procedures for a Comprehensive RUAA and a Basic RUAA Survey. (March 2014). Available on-line at: https://www.tceq.texas.gov/waterquality/standards/ruaas/index/#procedures (link verified April 28, 2017).

TCEQ, Texas Commission on Environmental Quality. 2010. 2010 Texas Surface Water Quality Standards. Available at http://www.tceq.texas.gov/waterquality/standards/2010standards.html (link verified April 28, 2017).

TIAER, Texas Institute for Applied Environmental Research. 2015. Recreational Use Attainability Analysis for One Segment in the Red River Basin and One Water Body in the Sabine River Basin, TSSWCB Project 15-57, Quality Assurance Project Plan, Rev. 0. Prepared by TIAER, Tarleton State University, Stephenville, TX.

TWDB. Texas Water Development Board. 2017. Palmer Hydrological Drought Index (Monthly). Available at https://waterdatafortexas.org/drought/phdi/monthly?time=2015-04 (link verified April 28, 2017).

USCB, United States Census Bureau. 2010. Census 2010 Data, Washington D.C. Census Block Data available at http://www.census.gov/geo/maps-data/data/tiger-data.html with demographic data available at http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (links verified April 28, 2017).

USDA, U.S. Department of Agriculture. 2012. National Agricultural Statistics Service. Available at http://www.agcensus.usda.gov/Publications/2012/ (link verified April 28, 2017).

USEPA, U.S. Environmental Protection Agency Enforcement and Compliance History Online 2016. Available at http://echo.epa.gov/?redirect=echo (data queried on Februrary 28, 2016).

USEPA, U.S. Environmental Protection Agency. 2009. In: Drinking Water Contaminants. Available online at http://water.epa.gov/drink/contaminants/ (link verified April 28, 2017).

USGS, United States Geological Survey. 2006. Multi-Resolution Land Characterization (MRLC) Consortium, 2006 National Land Cover Database (NLCD). Available at http://www.mrlc.gov/index.php (link verified April 28, 2017).